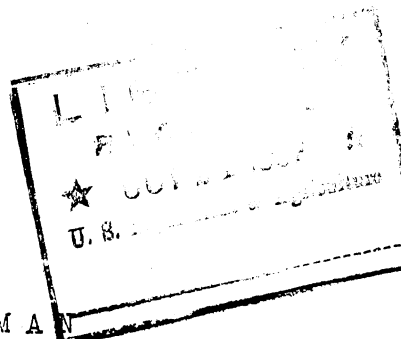


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## PROGRESS REPORT ON MEAT STORAGE STUDIES

By R. L. Hiner,  
Bureau of Animal Industry,  
U. S. Department of Agriculture.

- - -

The proper handling and storing of cured meat has a definite influence on its quality and palatability. In view of numerous inquiries from extension workers and farmers regarding the meat phase of "live-at-home" programs, studies were inaugurated at the U. S. Animal Husbandry Experiment Farm at Beltsville, Md., to determine the influence of different storage methods on the quality of the product. The first test dealt with cured hams.

It is well known that changes occur in stored meat and that these changes may be influenced by temperature, humidity, air, and light. Air and light were the factors considered in this test.

Fifty-two hams were used. The live weight of the hogs from which the hams were obtained ranged from 159 to 268 pounds. The hams were cut the standard square-top style. All rough and hanging pieces of lean and fat were trimmed off. Care was used not to expose any more of the lean than necessary and yet leave a smooth trimmed ham. These trimmed hams ranged in weight from 11.9 to 21.0 pounds.

The 26 hogs were slaughtered on the same day. The carcasses were chilled to 34° to 38° F. as rapidly as possible and were cut four days after slaughter. The hams were put in cure two days later.

The hams were all cured in the same vat by the dry-cure method, involving the use of 8 pounds of common salt, 2 pounds of brown sugar and 4 ounces of saltpeter, per 100 pounds of meat. One-half of the mixture was rubbed thoroughly on the hams when put to cure, one-fourth at the end of five days and the remaining one-fourth after ten days more. The hams were cured at a temperature of about 38°F. allowing 3 days' curing for each pound of weight of the average weight ham.

At the end of 43 days the hams were removed from the curing vat and hung singly in the air for 14 days. They were then washed in cold water, hung overnight and smoked with hardwood smoke for about 10 hours per day on successive days at a smoke-house temperature that did not exceed 110°F., until a chestnut-brown color was obtained.

As soon as the smoking was completed the hams were moved to a tightly screened storage room which was ventilated by a large open window and a roof vent thus allowing the same fluctuations in temperature and humidity for all the hams.

The hams were prepared for storage as follows:

- (1) 8 unwrapped hams were hung near the window in the light.
- (2) 8 unwrapped hams were hung next to (1) but largely protected from the light by a black cloth that was held away from the meat by a square frame on four sides, but not above the meat and only partially below it. <sup>1/</sup>
- (3) 8 hams were wrapped in white parchment paper and placed in muslin ham bags and hung up.
- (4) 8 hams as in (3) excepting the bag was painted with yellow wash.
- (5) 8 hams as in (3) excepting bag was thickly coated with paraffin to exclude all air possible.
- (6) 4 hams were sealed in large rubber bags and hung up.
- (7) 4 unwrapped hams were buried in and well covered with whole oats.
- (8) 4 unwrapped hams were buried in and well covered with crushed rock salt.

Advantage was taken, as far as possible, of the opportunity for pairing the hams. For example, one ham from a particular hog was stored as indicated under (1) above and the other as indicated under (2). Care was used to obtain a balance of left and right hams under each method of storing.

The hams remained in storage from July 14, 1931 until February 2, 1932 or 203 days. Weights were taken every two weeks during storage.

The mean temperatures, in degrees Fahrenheit, which prevailed at Beltsville, Md., during the period of July 14, 1931 to January 31, 1932 are shown by months in Table 1 as follows:

Table 1.  
Temperatures at Beltsville and mean humidity at Washington,  
D. C., from July 14, 1931 to January 31, 1932.

Month	Outside temperature	Storage-room temperature			Humidity
	Mean	Mean	Range in High	Range in Low	Mean
July 14-31, 1931	78.9	78.2	-	82-75	72
August	74.0	77.1	90-66	86-62	76
September	72.0	75.5	86-68	81-60	75
October	53.1	65.5	84-61	75-53	72
November	50.5	60.5	73-51	66-50	74
December	40.5	51.3	62-48	59-47	68
January	45.8	55.7	69-49	67-48	69

<sup>1/</sup> Relative shrinkage is of interest in this connection. See Table 2.

The mean temperature refers to the average of the high and low daily readings for the month. The humidity readings are those recorded by the U. S. Weather Bureau at Washington, approximately 15 miles away and are reported to indicate prevailing conditions. The mean humidity as reported is the average of daily humidity readings taken at 8:00 A. M. and 8:00 P. M. for each day of the month.

On February 2, 1932, the hams were taken from storage, weighed, and graded for amount of mold, firmness of fat and of lean, aroma and color. Some were selected for cooking and palatability tests.

The following table gives the more important observations on the uncooked cured meat.

Table 2  
Average initial smoked weight, shrink in storage and grading for amount of mold, firmness of chilled carcass, firmness of ham after storage, and aroma for each of the storage methods.

Method of storing	Average smoked weight Pounds	Shrink in storage Per cent	Amount of mold	Firmness of chilled carcasses at 34° F.	Firmness after storage at room temp.		Aroma	
					Fat	Lean	Kind	Intensity
(1) Unwrapped (light)	14.95	15.02	Very small	MH	MH	FMD	Flat to stale	Perceptible
(2) Unwrapped (dark)	14.76	15.34	Sl. large	MH	MH	MF	Pungent to flat	Sl. pronounced
(3) Ham bag	15.09	13.20	Mod. "	MH	MS	MF	ditto	ditto
(4) Yellow wash	14.07	14.83	Sl. "	MH	MS	FMD	Flat	Mod. pronounced
(5) Paraffin	14.98	0.44	Small	MH	S	MS&V	Sour	ditto
(6) Rubber bag	14.87	1.35	Sl. large	H	S	MS&V	Spoiled	Pro- nounced
(7) Oats	13.55	13.06	" "	MH	MS	MF	Stale & musty	Mod. pronounced
(8) Salt	14.75	9.15	Mod. "	MH	MS	FD	Stale	ditto

MH, medium hard; MS, medium soft; S, soft; FD, firm and dry; FMD, firm and moderately dry; MF, moderately firm; MS&V, moderately soft and velvety; Sl, slightly; Mod., moderately.

Methods of storage may be classed in three groups with respect to shrinkage during the storage period. Methods (5) and (6) resulted in very little shrinkage, method (8) in an intermediate amount, and the

other five methods, relatively large amounts. Methods (1) and (5) resulted in "very small" and "small" amounts of mold, respectively; methods (2), (4), (6) and (7) in a "slightly large" amount, and methods (3) and (8) in a "moderately large" amount.

The fat of the hams sealed in paraffin and rubber bags was soft when examined at room temperature, whereas that of all other hams was of a firmer consistency. Likewise the lean meat of the hams sealed in paraffin and rubber bag was less firm than that of any of the others. This difference appeared in spite of the fact that all the meat came from hogs with fat that graded "hard" or "medium hard" in the chilled carcass.

Associated with the small shrinkage and the softness of the fat and lean of the hams stored under method (5) and (6) was found an undesirable odor. It was described as "sour" for the ham sealed in paraffin and as "spoiled" for those stored in rubber bags. In both instances the meat was judged to be unfit for food. It is also worthy of comment that the hams stored in oats and salt gave off "stale and musty" and "stale" aromas, respectively. Hams stored by method (1) unwrapped near the window, had a perceptible aroma that was "flat to stale."

Palatability was tested on three hams from each storage method, judged fit for food, except (7) buried in oats and (8) buried in crushed rock salt, when two were used. The hams were soaked for 20 to 25 hours in enough cold water to cover them. They were then baked at 125° C. until their internal temperature, as determined by a meat thermometer, reached 76° C. The cooked ham was then weighed and the following day, when cold, tested for palatability.

Variations in palatability existed to some extent in these hams. The most striking deviation from the average was with those stored in crushed rock salt. They were salty, and tended to be tougher than their mates stored by other methods.

The musty odor of the hams stored in oats persisted throughout the cooking process.

The results from this preliminary work on storing cured meat indicate that there are two methods apparently not advisable to use, namely, the use of paraffin and rubber bags to make an air-tight package. It appears that hams stored this way may be expected to spoil. The wrapping of hams in parchment paper then bagging so as to partially exclude the air and light is the more desirable method of storing. These storing experiments are being continued again this year.

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UTILIZING COLD STORAGE  
FOR CURING FARM MEATS

By W. T. Cobb, Agent in Animal Husbandry,  
Louisiana

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As a result of having "guaranteed weather" at their disposal, Louisiana farmers saved 500,000 pounds of meat through cold storage during the year ended June 30, 1932, as compared to 5,000 pounds saved in this manner in the preceding year. When compared to the population of the State, about 2 1/2 million, this amount is not large, but a start has been made and some fifteen ice plants in the State are cooperating with some 1,500 farmers who are using this method for preserving their farm meat supply.

Much more is expected from the coming season's campaign as it will be started earlier and more territory will be covered as an additional worker will devote part of his time to this phase of extension work in the State.

In this State and in other Gulf coastal States the curing of farm meats has been neglected, even in days of stress on the farm, because of the risk of losing the meat due to warm spells of weather that occur even in winter. This condition has been an important factor in preventing the complete adoption of a live-at-home program in these States. However, since Georgia and Florida have shown the way to a remedy for this condition, by the use of cold storage it only remains for the extension forces to assist the farmers in the practical utilization of the facilities available.

With this in mind the extension force and the animal husbandry department of the State university started a campaign last winter with the gratifying results mentioned above, and we hope that the methods used in conducting this campaign may be of interest to others who contemplate such a program.

We are of the opinion that the use of cold storage can be utilized much farther north than at present considered necessary as this method places at the disposal of the farmers a nice white frost every morning, no matter what time of the year it may be. This allows killing and curing the farm meat when the hog is ready, without the attending loss when he has to wait for a good spell of weather. It also allows him to breed his hogs at the most convenient time for the litters to do well, for he is not confronted with the problem of holding down the weights after the hog is ready while waiting for a spell of weather that will take the risk out of his operations.

The methods we have pursued in Louisiana are about as follows -

The specialist visits the territory in which he expects to put on method demonstrations in the cutting and curing the meat, meets the county agent and with him visits the local ice plant in order to get the owner's or the superintendent's cooperation and learn the service given and prices charged. We consider this essential as without the full cooperation and help of these agencies, little will be accomplished. Once real cooperation is assured, the county agent advertises a meeting, selects the farmers who are to be the cooperators in furnishing the meat, and sees that all materials are ready for the meeting. A failure on the part of the agent at this point will probably mean failure for the entire project in that particular territory for some time at least.

Care has been used in selecting the men from whom the hogs were secured in order that the county may be covered as completely as possible, having a representative from as many communities as convenient. It is planned during the coming season to have complete demonstrations beginning with the killing and cleaning and finishing with the cutting and curing of the product, but up to the present time we have confined ourselves to giving general instructions, regarding slaughtering, to the cooperators at the time of killing and making suggestions at the time the demonstration is held.

We also prefer that the actual demonstration be held at the ice plant. The advantages of cold storage are more easily demonstrated when the farmer can see and feel the "weather" in the cooler. Once the demonstration is concluded the meat is immediately placed in storage and all present are invited to enter the coolers. We have found that demonstrations held in school houses or at farm homes have not been as successful as those held when some type of commercial or farm constructed cold storage was available.

Louisiana is particularly fortunate in having at the head of the animal husbandry department of its university a well-trained and enthusiastic meats man. This is Prof. J. B. Francioni and it is largely due to his efforts and enthusiasm that the program has been able to go over. He has been extremely active in giving demonstrations, training men, and in getting publicity for the work.

Aside from the actual saving to the farmers and the service rendered them, the work has been of tremendous importance in building good will for extension work in general and has proved to be



one of the most popular projects that has been initiated by the extension forces in this State.

Finally every extension means and agency should be used if the best results are to be obtained, and the method demonstration as such is a small part of the effort involved, for news articles that precede the demonstration, the report of the actual demonstration and the follow-up story should all be prepared either by the specialist or the county agent, and have their effect on the future operations. Once the meat is in cure the agent should keep in touch with the cooperators, advise them of the time to remove from cure, and assist them in smoking and storing.

One community in Louisiana has taken advantage of the home cured meats and the home-canned products to put on a live-at-home festival in which the meats and food products were shown. This has been a very effective method of arousing interest and more of the same kind of thing is contemplated. This and other follow-up ideas are essential if interest is to be aroused in new groups and interest held in those participating. It is the follow-up work that carries a program through to the fullest extent of its possibilities.

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STATISTICAL REPORT OF ANIMAL HUSBANDRY EXTENSION WORK, 1931

Summarized from county agents' reports)

	Beef cattle	Sheep	Swine	Horses & mules
Adult result demonstrations.....	7,961	8,363	17,839	764
Junior projects completed.....	14,414	9,216	44,132	785
Farms aided in obtaining purebred sires	5,728	7,130	13,356	153
Farms aided in obtaining high-grade or purebred females.....	2,636	3,487	13,639	234
Sire circles or clubs organized.....	32	36	168	24
Membership in same.....	235	450	1,175	424
Herd or flock improvement associations organized or reorganized.....	55	80	58	12
Membership in same.....	1,161	5,069	1,157	200
Farms not in associations keeping per- formance records of animals.....	826	974	2,171	126

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## EXTENSION WOOL WORK IN WYOMING

By J. R. Neale, Extension Animal Husbandman, Laramie.

The chief effort of the Wyoming Extension Service in wool-improvement work has had for its goal an improvement in the uniformity of grade of any wool clip and an increase of the average fleece weight. For more than 20 years Dean Hill of the Wyoming Experiment Station, who is also wool specialist for the Wyoming Agricultural Extension Service, has conducted demonstrations in sheep culling for wool improvement. It has only been since 1926, however, that a special effort has been made to check the results of such culling demonstrations. In that year Dean Hill, cooperating with D. J. Robertson, extension livestock specialist at that time, started a number of five-year, fleece-weighting demonstrations in order to show that the average fleece weight in any flock may be increased, and the uniformity of grade in the entire clip improved by discarding light shearing and off-grade sheep. These demonstrations were important too in that they gave positive proof of the effectiveness of the so-called "chute" culling method used by Dean Hill for working range sheep. During the last four years the fleece-weighting work has been done almost entirely to demonstrate effectively the accuracy of the "chute" culling method. The last of the fleece-weighting demonstrations was completed in the spring of 1932. A brief summary of this particular demonstration may be of interest.

County agent Llewellyn of Sheridan arranged with J. Paul Dodd of his county to cooperate in the demonstration. Mr. Dodd has proved to be an extremely desirable cooperator. He had at the time the demonstration was started, 450 head of rather nondescript ewes of Hampshire, Rambouillet, and Lincoln crosses, and was most desirous of developing this flock into a straight white-faced band of ewes shearing a good fleece of 1/2 to 3/8 blood wool, uniform throughout the band. Mr. Dodd believed, as many other sheepmen believe, that it wasn't possible to have a band of heavy-shearing ewes that would also raise good lambs--that the light shearers would always have the best lambs. To satisfy himself on this point, serially numbered ear tags were put in the ears of every ewe. This practice has been followed throughout the five years of the demonstrations. He also wished to increase the size of his flock as rapidly as possible, without buying any breeding stock other than bucks. It was decided to use Corriedale rams throughout the demonstration and these have been consistently selected from the fine flocks of a breeder near Sheridan, Wyo. No doubt these rams have had as much to do with the success of this demonstration as has the culling.

Throughout the demonstration these sheep have been run on mountain range during the summers and on foothill range, supplemented by a very limited amount of alfalfa hay, in winter. Generally the feed has been short, and during the severe winter of 1931-32 the band of 1,000 ewes received only two tons of alfalfa hay and less than one ton of corn while grazing on snow-covered range grazed by cattle during the previous summer.

Briefly, the methods followed were: To weigh and grade each fleece every spring and record weight and grade with the number of the ewe producing it and the placing of an identifying paint mark on each ewe to show whether her fleece was light, medium, or extra heavy in weight.

The actual culling was done through the chute about October 1 each year, just before the lambs were shipped. This culling was done by the "touch" system, and no attention was paid to the fleece marks made in the spring until the culls were cut out, when numbers and fleece weights were checked. Ewe lambs were also carefully culled at this time. As a rule, 7 to 10, and as high as 15 per cent of the poorer ewes were taken out each season. Fleece weights of yearlings were always considered in the averages. Briefly, the results were as follows:

Year	No. ewes	Ave. wt. fleece	Shrink*	Ave. grade
		Pounds	%	
1928	437	7.2	51.5	Fine to low 1/4 blood
1929	548	7.69	52	Fine to 1/4 blood
1930	526	8.6	52	Fine to 1/4 mostly 1/2-1/4 blood
1931	754	9.01	54	Mostly 1/2 to 1/4 blood
1932	984	10.54	56	34% 1/4 blood, 44% 3/8 blood, 22% 1/2 blood

The average increase in weight per fleece for the four-year period was 3.34 pounds on a grease basis or 1.14 pounds on a scoured basis.

This demonstration showed conclusively that sheepmen can have ewes that not only shear a heavy fleece, but produce as good lambs as the light shearers; that the ewe that shears a fleece heavier than the average this year will normally shear a fleece heavier than the average next year, and that the light shearer this year will be the light next year; that sheep can be positively and accurately culled by the "touch" system in the chute; and that it pays to use well-bred rams.

\*Shrink determined by scouring representative samples at University of Wyoming Wool Laboratory.

## NEW METHOD FOR DETERMINING WOOL FINENESS

By J. I. Hardy

Senior Animal Fiber Technologist  
U. S. Bureau of Animal Industry.

When the fineness of wool is to be determined for a large number of sheep the usual method is to judge it by the eye. This may be fairly well done for ordinary flock improvement by any trained person after he has trained his eye to the fineness of the different grades or spinning counts. Usually it is a question of placing judgment upon a sample and then looking at samples of known fineness to find out how accurately the judgment has been made. After this is done many times with samples representing the entire range of fineness most workers become very proficient in recognizing the fineness of different fleeces.

In the research work of the Bureau of Animal Industry, hundreds of fleeces are scored for fineness each year. Here a committee of three, each working independently, scores the fleece of each sheep. The average of these three independent judgments is the fineness value used in conducting the breeding operations. Each year this committee consists of at least two members of the committee which scored the fleeces the previous year. This plan makes it possible to maintain uniformity in scoring from year to year and also makes it possible to coach any newly trained man added to the committee.

As an aid in judging fineness the committee uses a set of spinning-count samples which have been made up from the same types of wool which they are to judge. In the preparation of this set of samples the fineness, as it appears to the eye, and the actual measured fineness are both taken into consideration. It may be necessary to examine many samples before a set of seven satisfactory standard samples is obtained which entirely meets this requirement. This is because there are so many fleeces, especially from crossbred sheep, from which a sample may appear entirely different to the eye than it is found to be by actual measurement.

The reason that certain samples appear different than they actually measure is that some of the fibers in the sample stand out prominently on account of their crimp or distribution of fine and coarse fibers, which makes the entire sample misleading so far as the actual fineness is concerned. The difficulty is that many samples have a mixture of fine and coarse fibers. In the case of such samples there may be wide disagreements among the judgments for fineness given by different judges, inasmuch as one judge may pay more attention to the fine fibers and judge the sample as

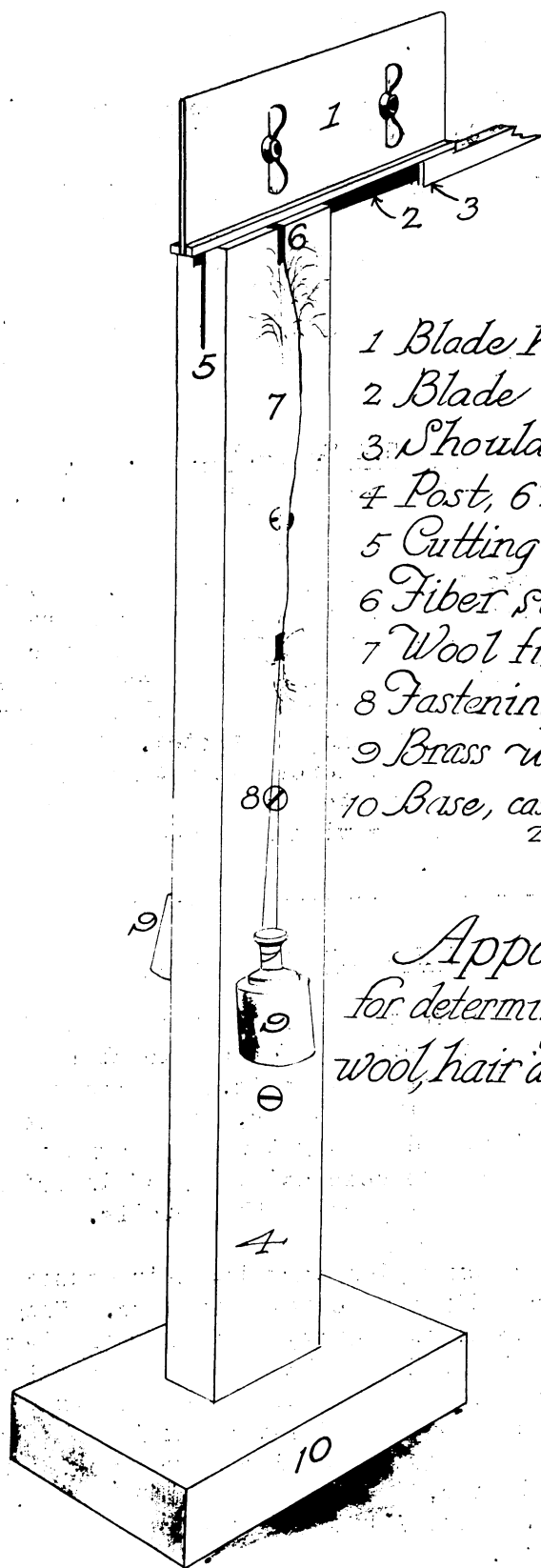
of a higher fineness than another and vice versa.

The eye method of judging fineness has been considered sufficient for most purposes of general flock improvement. Its rapidity makes it the only practical method where large numbers of fleeces are being judged on the animal under average commercial conditions. Where outstanding breeding rams and ewes are being selected in a breed-improvement program, a more accurate method is desirable. A satisfactory method for such work must not only yield accurate results but it must also be relatively quick and easy to apply.

A survey of the literature revealed no method which seemed adequate to meet these demands. The use of the ordinary microscope, the projection microscope and the micrometer caliper were regarded as not practical for this particular purpose although they yield good results in the laboratory. Failing to find a satisfactory method the writer has undertaken to develop one which he believes will be of practical value. This method consists of placing a small strand of cleaned and dried wool into a metal slot of a definite size in a piece of brass  $1/8$  inch thick. Any fibers of the strand failing to crowd into the slot are cut away by a specially arranged razor blade and the fibers that just fill the slot and remain uncut are removed and counted by the use of a pair of small tweezers. Details of the arrangement of this apparatus are shown in the accompanying sketch. The cutting device which is removable is shown in position for cutting. The slot found to work most satisfactorily is similar in shape to half of a cross section of the two-edged type of safety razor blade and slightly wider. The base of the slot tapers to a sharp angle. The cutting slot which is transverse to the fiber slot must be a snug fit for the cutting blade which is of the two-edged safety type. Only new razor blades should be used for cutting. Thorough cleaning of the wool avoids dulling of the cutting blade. Usually 100 cuttings can be made before it becomes necessary to change the blade. Ten-gram balance weights are used as a means of obtaining tension upon the fibers while they are being cut.

Before making a series of fineness measurements the fiber slot should be standardized with a sample of known fineness. The slot should be checked with such a sample after at least every 50 cuttings. For the tests herein reported the razor blade was so adjusted as to leave 25 fibers of 36s wool top in the slot.

The apparatus constructed as shown in the sketch is very simple to make. An improvement is being tested to facilitate the adjustment of the knife. Many samples of wool have been tested from sheep of known breeding as well as samples of commercial greasy wool, all of which had been previously graded for fineness by an experienced grader. The practical possibilities of this method are best shown by giving the results obtained upon wool tops ranging in fineness from 36s to 80s.



- 1 Blade holder
- 2 Blade
- 3 Shoulder
- 4 Post, 6" x 1/2" x 1/8"
- 5 Cutting slot
- 6 Fiber slot
- 7 Wool fiber
- 8 Fastening screws
- 9 Brass weights
- 10 Base, cast metal  
2" x 3" x 1/2"

*Apparatus  
for determining fineness  
of  
wool, hair and other fibers.*

Table 1.

Number of wool fibers of 12 different grades of wool top\* ranging in fineness from 36s to 80s that filled the slot in five different tests.

		36s	40s	44s	46s	48s	50s	56s	58s	60s	64s	70s	80s
Slot Test No.	1	27	27	31	36	35	35	48	57	61	64	74	86
"	"	2	27	27	26	31	40	38	45	53	66	59	78
"	"	3	24	32	29	33	41	48	46	53	63	63	79
"	"	4	26	28	36	32	35	43	41	54	59	66	70
"	"	5	23	29	34	35	41	43	43	54	58	70	72
Ave. No. of fi-													
bers in slot		25.4	28.6	31.2	33.4	33.4	41.4	44.6	54.2	61.4	64.4	74.6	83.8

\*These grades of wool top corresponded in fineness to the U. S. Official Standards for wool top.

The slot tests for fineness in the case of wool top, is very satisfactory inasmuch as the fibers have been mixed by machinery and the fine and coarse fibers for each sample of a different fineness are uniformly distributed. With wool as it comes from the sheep the method also works well although of course the variation in fiber numbers will vary according to the uniformity of the samples tested. The slot test method for fineness yields the average fineness in a quick and satisfactory manner and should prove of value to those who have use for such results, whether it be a breeder working with his sheep or a wool man who wants a quick test on a wool top.

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#### ILLINOIS DIVISION OF RESPONSIBILITY

The farm advisers have done more than all other agencies in promoting the livestock projects. They arrange for the local selection of farm demonstrators, arrange for county schools, and also conduct local schools for the instruction of the leaders, and they check up on the work and hold farm meetings and county tours of farms to show results. The farm adviser carries the responsibility of inducing the local committees to carry on their part of the details.

Most of the other livestock extension work in their counties depends upon the interest and activity of the farm advisers. They promote the boy's livestock club work, the county fairs and the farmers' institutes. Farm advisers and Smith-Hughes high school agriculture teachers cooperate with the animal husbandry department to train and bring in boys to compete in the annual State livestock judging contests at the university. The extension specialist gives assistance to high schools, farmers' institutes, fairs, breed associations, livestock marketing organizations and the Illinois Agricultural Association in promoting their projects.

--From 1931 Illinois Animal Husbandry Annual Report

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## WHAT'S NEW IN THE STATES

### Indiana

Three leading meat packers supported the third annual show and sale of club lambs at the Indianapolis stock yards in July. The lambs were the best ever shown there, nearly all being wethers, the balance ewe lambs and all docked. They averaged 73 pounds and had been grown mostly without a bit of grain. It was a fine demonstration of profitable lamb raising. The 362 lambs came from 14 counties. The 75 boys and girls who owned them won \$310 in prize money put up by local firms. Wilson and Company purchased 250 of the lambs, while the remainder was taken by Swift and Company, and Kingan and Company. The entire lot sold a half dollar per hundred-weight over the local market.

A fat-lamb show and grading day was held at Lagro on July 2, in which producers of Grant, Huntington, Wabash, and Whitley counties were invited to bring in fat lambs. Prizes were given for the best pen of ten market lambs and also pen of three lambs in the 4-H Club class. Producers were invited to bring in additional lambs for grading with the option of taking them home or selling locally after the show. There were 175 head of lambs brought in and graded in five different grades. Each lamb was marked with a circle of paint on the head, each color signifying a different grade. After lunch, Prof. J. W. Burch, of Missouri, explained the grading of the lambs, an outline of work being attempted in an effort to assist the sheep industry of the community. Carcasses of high and low grade lambs were displayed, one of them being cut up to show the market cuts. Some 400 people were in attendance showing much interest and indications of making this event an annual affair.

The interest in horse production has materially increased in the last two years and in Adams County the enrollment in the Gold Medal Colt Club will exceed that of last year. The most significant feature is that the actual work of enrolling is carried on by a county-wide committee of interested horsemen. The Gold Medal Colt Club Show will be held in connection with the 4-H Club Show. Last year 37 colts were enrolled and over 50 per cent of them have been sold out of the county at good prices, indicating an active demand for draft horses of good breeding. In Grant County, 25 colts belonging to 22 men and one girl were enrolled in the Gold Medal Colt Club, although the work of weighing in and enrolling came during a busy week of threshing. In addition to the incentive given by members of the committee, the prizes from the county fair and the medals from the Indiana Livestock Association, one of the local banks will supply prizes based on the costs of gain or on some similar basis. In Hamilton County, 35 colts have been enrolled and plans have been



completed for the State Draft Horse Breeders' picnic and the Hamilton County Gold Medal Colt Club show to be held at Noblesville.

### Louisiana

W. T. Cobb has been made State leader of animal husbandry extension work. G. L. Burleson, former assistant State club leader has been transferred to animal husbandry extension, while H. M. LaCroix former extension animal husbandman has taken up the club work formerly done by Mr. Burleson. These changes were effective July 1, 1932.

### Maryland

The first purebred ram sale ever held in Maryland was held at College Park on May 29, 1926. Purebred rams had been distributed prior to this time in various ways, but the auction plan was adopted on this occasion as the type of distribution having the most desirable features.

From 1926 to 1932, 19 sales have been held in Maryland at which 448 rams have been disposed of at an average price of \$26.94 per head.

The following is a report of the 1932 sales:

Date and place	No. rams sold	Av. price per head	No. different counties taking rams *	No. different individual purchasers	No. rams sold out of State
Timonium					
July 12	19	\$17.37	5	18	0
Pocomoke					
July 16	25	11.62	3	22	7
Centerville					
July 26	33	17.18	6	18	2
Boonsboro					
August 2	19	13.63	3	17	1
Oakland					
September 3	23	14.24	1	21	2
Totals	119	\$14.91	18	96	12

\*Maryland counties only.

The selling of rams this year has been a very difficult proposition. We have, however, sold every ram offered and there are practically no good yearling rams left for sale in the State at this time. The sales seem to be solidly established and the flock owners are

coming to depend on them for their rams. Our purebred breeders are squarely behind the sales and need to do only a little more culling to supply them with rams of high quality and keep them going in a good way.

Our system of publicity consists of four or five news stories, paid advertising, and circular letters or cards to all sheepmen in the territory where a sale is to be held. We do not advertise all the sales in the series together, but take each one separately and build the publicity around it.

The management of purebred ram sales is a very fascinating line of work and must be even more so where flocks are numerous and large in size. In Maryland our sheep are found in only about 4,000 flocks containing around 100,000 breeding ewes.

--K. A. Clark

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#### Montana

Isaac Anderson was appointed extension animal husbandman on July 1, 1932, to succeed D. E. Richards, resigned. Mr. Anderson was formerly county agricultural agent in Caribou County, Idaho.

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#### Nebraska

Walter Tolman has been appointed assistant in animal husbandry extension work.

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#### North Dakota

John T. E. Dinwoodie was appointed extension animal husbandman March 1, 1932.

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#### ILLINOIS BEEF HEIFER CLUBS

The purebred heifer club attempts to interest the older club member in establishing purebred herds of breeding stock on Iowa farms. Naturally it is limited to a select group who must have definite qualities to succeed. The expansion in territory covered, and an increase of about 75 members completing over the preceding year are objectives achieved. In the counties where the work has been conducted for three years or more, may be found some outstanding small herds of purebred cattle. Quite a number of the outstanding purebred show herds of Iowa today are those built from a purebred heifer foundation and at present owned by club members.

--P. C. Taff, Iowa Club Leader, F. P. Reed and J. S. Quist, Assistants.

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## THE RELATION OF BIRTH WEIGHT TO GROWTH IN PIGS

By E. Z. Russell,  
Senior Animal Husbandman,  
U. S. Bureau of Animal Industry

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When a little of good strong, thrifty pigs is produced we often give credit to the dam or the sire, or both, sometimes to weather conditions, perhaps to a particular feed or combination of feeds and, possibly on occasions to all these factors, but practically never have we considered the birth weight of the pig as having anything to do with its ability to grow. We believe that after a study of the data given in the tables shown in this article, one must at least consider the possibility that birth weight has something to do with the vitality and growth of the pig.

Few, if any, of our breeders of hogs have taken and recorded the birth weight of their pigs, consequently, little or no attention is paid to it when making selections of breeding animals to be placed in the herd. Practically never have we given birth weight any consideration when we notice an extra fine growthy pig in the herd, yet based on the figures shown in these tables, may not that factor be quite important?

Table 1 shows the number of pigs of each of the various birth weights, the average daily gain from birth to 70 days of age (suckling period) and the gains from that date until they reached a market weight. These pigs were raised at the U. S. Range Livestock Experiment Station at Miles City, Mont., during the years 1927-1931 inclusive. The hogs at this station are all handled in the same manner and fed the same feeds. The principal feed is barley supplemented with tankage, alfalfa pasture and alfalfa hay.

Table 1  
Average Daily Gain of Pigs from Birth to Market

Birth weight, (lbs.)	1-1/2	1-3/4	2	2-1/4	2-1/2	2-3/4	3	3-1/4	3-1/2	3-3/4	4
Number farrowed	26	37	162	167	321	200	250	101	93	37	35
Ave. daily gain during suckling (lbs.)	.38	.44	.46	.50	.52	.52	.56	.56	.62	.65	.63
Ave. daily gain during fattening (lbs.)	1.18	1.20	1.23	1.27	1.32	1.32	1.35	1.36	1.43	1.43	1.44

Note -- The total number of pigs involved was 1,429, the average daily gain during suckling for all groups was 0.53 lb. and during the fattening period was 1.32 lbs.

This table shows a very close correlation in the rapidity of gain and birth weight from birth to 70 days of age as well as from 70 days to market weight. It does not seem to make any difference in the relative gains whether the pigs were fed a full feed and were being fattened for market or whether they were suckling their dams. During suckling the pigs had access to feed in a self-feeder.

The pig farrowed dead is a loss to which little attention is paid. Such a pig is disposed of with little thought but is a serious source of loss. The following table shows the per cent of pigs of the different weights that are dead when farrowed.

The data shown in Table 2 are based on the records of all the pigs farrowed at five U. S. Animal Husbandry stations for the years 1927-1931 inclusive. These stations are located at Beltsville, Md., Miles City, Mont., Ardmore, S. Dak., Jeanerette, La., and McNeill, Miss.

Table 2  
Pigs Farrowed and Percentages Farrowed Dead and Weaned

Birth weight, (lbs.)	1	1-1/2	2	2-2/2	3	3-1/2	4
Number farrowed	166	543	1,422	2,064	2,120	1,059	381
Per cent farrowed dead	39.38	15.84	9.42	6.30	6.03	3.12	4.46
Per cent weaned	5.00	30.20	55.98	68.22	74.20	79.03	83.46

Note -- A total of 7,749 pigs were involved, the average percentage farrowed dead for all groups was 7.54 and the average percentage weaned was 66.10.

It will be noted that in Table 1 birth weights are shown by one-quarter pounds, while in Table 2 they are shown by one-half pounds. This is due to the fact that reports of birth weights from all stations did not give the data by one-quarter pounds.

It is interesting to note the very high percentage of one-pound pigs that failed to live to reach market weight and the rapidity with which this loss is reduced as the birth weight increases. The percentage of pigs weaned, of the different birth weights, as shown in the last line in this table is of vital interest to the hog producer, for his money comes from the pigs that are actually marketed. Since birth weight apparently has a very decided influence on the percentage of pigs weaned, the question of how birth weights may be increased becomes one of extreme importance. Further studies are being made of available data to learn the possibilities in controlling the factors responsible for birth weight in such a way as may be put to practical use.

## U. S. D. A. FILM STRIPS

Film strips are rapidly proving their value as an aid to extension teaching methods. They provide pictorial argument in support of recommended practices in convenient and low-cost form.

The department is attempting to keep pace with the increasing demand of extension workers for assistance in this field.

The following is a list of the livestock subjects on which film strip series are now available with prices prevailing during the present fiscal year. Blank forms for ordering film strips may be obtained by addressing Extension Service, U. S. Department of Agriculture, Washington, D. C.

### Livestock Film Strips

<u>Series Number</u>		<u>Price</u>
41	Types and Breeds of Beef and Dual-Purpose Cattle (34 frames)*	\$ .28
43	Breeds of Horses (59 frames)	.35
44	Breeds of Swine (31 frames)	.21
52	Swine Management (38 frames)	.28
53	Hog Houses and Equipment (30 frames)	.21
129	Judging Sheep (34 frames)	.28
132	Judging Draft Horses (59 frames)	.35
141	Breeds of Sheep (35 frames)	.28
142	Judging Hogs (27 frames)	.21
143	Judging Beef Cattle (43 frames)	.28
146	Preparing Beef Cattle for Show or Sale (42 frames)	.28
162	Care of the Horses' Feet (41 frames)	.28
195	Breaking the Farm Colt (24 frames)	.21
215	Market Classes of Hules (28 frames)	.21
225	Farm Sheep Raising (60 frames)	.35
240	Farm Horseshoeing (72 frames)	.42
246	Keeping Livestock Healthy (37 frames)	.28

Two new series entitled "Dressing and Cutting Pork on the Farm" and "Curing Pork on the Farm" are now in preparation and will be available at an early date.

\*A frame is a picture, diagram, table, or explanatory legend appearing in the film strip.

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### BETTER SIRES WORK IN KENTUCKY

Since 1920 emphasis has been placed upon the eradication of scrub and grade sires in Kentucky and replacing them with purebreds. During these eleven years extension agencies in Kentucky have aided in placing 17,148 purebred sires. These included 6,465 beef and dairy bulls, 7,096 rams and 3,587 boars. Of this number 549 bulls, 800 rams and 276 boars were placed in 1931. As a consequence, the quality of livestock now being produced in the State is much better than was formerly the case. This work is expected to be aided by a purebred sire law which was passed by the legislature this year. This law reads:

"That no one shall be allowed to license and stand for public service any bull or boar except of pure breeding. Proof of this breeding must be established by the owner by showing certificate of registration in one of the herd books of one of the known breeds or by a sworn affidavit that the animal to be licensed is purebred and that the ancestry of each purebred animal has been registered or was eligible for registration in the records of one of the known breeds. In the case of establishment of a new breed it shall have been purebred for at least six generations.

"This act shall take effect and be in force on and after January 1, 1933."

In 1920 less than 20 per cent of the bulls in use in Kentucky were of pure breeding. At the present time, over 50 per cent of those in use in the State are purebred and some counties have succeeded in eliminating all grade and scrub bulls. In fact, each county in Kentucky has been active on the improvement of its livestock. Better-sire exhibits have been shown at many county fairs. During one summer 57 exhibits were made showing the value of purebred sires over scrub sires. Scrub-sire trials have been held in a large number of counties. These trials condemn the scrub sire and mold sentiment in favor of the purebred sire. Two better-sire special trains were run over the L & N railroad lines. These were conducted under the auspices of Kentucky Bankers Association co-operating with the L & N Railroad, Bourbon Stock Yards, Louisville, the College of Agriculture, purebred livestock breeders and others interested in improved agriculture. --Wayland Rhoads.

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### A NEW METHOD OF SUPPLYING DEMAND FOR PUREBRED BOARS

To create a desire for purebred boars and gilts among commercial hog producers who really need these animals to improve their present hogs is comparatively easy even under present conditions. To supply the demand offers considerable difficulty. In the first place farmers do not care to depend on the judgment of a breeder in supplying them with boars or foundation gilts. Frequently in this State, (Alabama) it is necessary to make a trip of from 50 to 100 miles to see the breeder's herd and they do not have the time nor the money to make the trip. As a result the desire created often goes unsatisfied and the value of the effort is lost.

To solve this problem we arranged with one of our most progressive Duroc-Jersey breeders to put 25 to 30 boars and gilts on a truck and take them into communities where they were needed. We selected the animals to be taken and put a price on each individual before they left the farm. A definite schedule was worked out for the trip and the county agents and Smith-Hughes teachers agreed to have interested farmers at each stopping place. The truck was decorated with experiment station literature and charts showing the advantages of using purebred sires on the common sows. Duroc-Jersey literature furnished by the breed association was also used. This made the truck easily recognized when it arrived and furnished an opportunity to get over an extension lesson in swine production.

The first trip was made through three counties covering a distance of over 200 miles in three days. All of us, including the breeder, were somewhat fearful of the results as we started out. However, we found at the first stop that this plan met the approval of the prospective buyers. They made their selection, paid for the hogs and took them home in their wagons without additional expense. The entire 38 head taken on the trip were sold at an average price of 11 cents per pound plus cost of transportation while hogs were only bringing 3 cents locally.

Two other trips were made in the same manner and all were successful. It is our plan to do considerably more of this work this fall and several breeders have requested our assistance in disposing of their surplus breeding stock in this manner.

--F. W. Durns, Alabama Extension Animal Husbandman.

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### RECENT PUBLICATIONS

"Influence of California Demand on Colorado Beef Cattle Prices" by L. H. Rochford - Colorado Extension Service Bulletin No. 316-A.

"Beef Cattle Feeding" by L. P. McCann - Ohio Extension Service Bulletin No. 130.

"Finishing Calves for the Market as Baby Beeves, Two-Year-Old, and Three-Year-Old Steers" by E. A. Livesay - West Virginia Experiment Station Bulletin No. 251.

"The Influence of Sex on the Quality and Palatability of Beef" by Helser and others - Iowa Experiment Station Leaflet No. 29.

"Cattle Management for Improving the Range" by Osland and Rochford - Colorado Extension Service Bulletin No. 319-A.

"How Old Are Your Bulls and Cows and What Difference Does It Make?" by Lush and Lacy - Iowa Experiment Station Bulletin No. 290a.

"Classes and Grades of Cattle and Calves Marketed from North Dakota" by Anderson and Denton - North Dakota Experiment Station Bulletin No. 254.

"The Calcium Requirement of Brood Sows" by A. G. Hogan - Missouri Experiment Station Research Bulletin No. 167.

"Swine Reproduction in Relation to Nutrition" by A. G. Hogan - Missouri Experiment Station Research Bulletin No. 168.

"Protein Supplements and Pastures for Swine" by Bray and others - Louisiana Experiment Station Bulletin No. 228.

"Swine Management" by W. C. Skelley - New Jersey Experiment Station Circular No. 259.

"The 4-H Pig Club" by Nordby and Gildow - Idaho Extension Service Bulletin No. 86.

"Studies with Hampshire Sheep, No. II", by Hultz and Gorman - Wyoming Experiment Station Bulletin No. 188.

"Fattening Lambs for Market" by Peters and Morris - Minnesota Extension Service Folder No. 37.

"Feedlot Fattening Rations for Lambs" - Colorado Experiment Station Press Bulletin No. 76.



"Killing and Cutting Lamb for Farm Use" by Fred H. Leinbach - Colorado Extension Service Bulletin No. 317-A.

"Sheep Club Manual" - Purdue (Indiana) Extension Service Bulletin No. 184.

"Stomach Worms in Sheep and Goats" by Hardy and Schmidt - Texas Experiment Station Bulletin No. 448.

"The Trench Silo" by McAlister and Stroman - South Carolina Extension Service Circular No. 121.

"Growth and Development with Special Reference to Domestic Animals" by various workers - Missouri Experiment Station Research Bulletin No. 166.

"Efficiency of Cooperative Livestock Shipping Associations in West Virginia" by W. W. Armentrout - West Virginia Experiment Station Bulletin No. 249.

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#### HOG-OFF OR SELL CORN?

F. W. Burns, Alabama extension animal husbandman has prepared a table showing the relative profitableness of hogging-off or selling corn in that State during the 17-year period, 1915 to 1931 inclusive.

The conclusions were summarized as follows -

- 1 - The 17-year period shows an average profit of \$5.37 per acre or 39 cents per bushel in favor of hogging off rather than harvesting and marketing the corn.
- 2 - Hogging-off was more profitable than marketing in all but 3 of the 17 years.
- 3 - An average price of \$1.37 per bushel for corn in the field would have been realized during the 17-year period if the corn had been marketed through hogs by hogging off.

Average Alabama hog prices were used in making the computations. Six and one-half bushels of corn and 36 pounds of tankage per 100 pounds of pork were the feed requirement figures used. Protein supplement was figured at \$40 per ton.

Similar calculations for other States should aid swine production projects. --C. D. Lowe.

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